ISHM - Integrated Safety Health Management

NASA Ames Research Center Computational Sciences Division

Space exploration is an inherently risky endeavor. Ames Research Center is developing and integrating health management technologies to make future NASA missions safer, more affordable, and more effective. Integrated systems health management (ISHM) is a systems engineering concept that makes it possible to detect potential system, hardware, and software failures and take appropriate recovery actions before conditions become critical.

ISHM technologies have the potential to reduce maintenance costs significantly while empowering crew and mission staff with precise, relevant operational information in real time. The systemwide approach begins with designing vehicles and systems that can detect problems, identify root causes, alert the crew, and take necessary actions to contain or remedy problems. ISHM covers a broad range of engineering disciplines, including:

- design for testability and maintainability
- advanced smart sensors
- prognostics for sensors and components
- monitoring and data mining for anomaly detection
- human-system interfaces for clear and unambiguous presentation of findings
- model based reasoning systems for diagnosis and recovery
- advanced on-board and ground-based mission and maintenance planners
- a host of other software and hardware technologies

ISHM-related hardware and software technologies are embedded in vehicle subsystems, maintenance operations, and launch and mission operations elements. Databases of component and system health state may be continuously updated and analyzed for critical failure modes and component lifecycle tracking.

Ames Research Center ISHM technology is onboard:

- The Stratospheric Observatory for Infrared Astronomy (SOFIA) (planned)
- Earth Observing-1 Satellite
- Ames Hybrid Combustion Facility
- International Space Station Command and Data Handling subsystem (planned)

Contact: Serdar Uckun
uckun@mail.arc.nasa.gov
Ann Patterson-Hine
Ann.Patterson-Hine@nasa.gov

http://ic.arc.nasa.gov